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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/519,623	12/30/2004	Adrian Murrell	005785 USA/IMPLANT/CONDUC	7848

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EXAMINER	
SAHU, MEENAKSHI S	

ART UNIT	PAPER NUMBER
2809	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/519,623	MURRELL, ADRIAN	
	Examiner	Art Unit	
	Meenakshi S. Sahu	2809	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 December 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 December 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *6/16/2005,12/30/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 8 - 11 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated over England et al. (US 6,093,456).

Regarding claim 1, England et al. disclose a wafer [referred to as target or substrate] support apparatus for an ion implanter having an implantation chamber for receiving an ion beam [abstract, col 1 lines 52 to 57, claim 1], comprising a wafer holder for holding a wafer in the implantation chamber during implantation [claim 1, "a substrate holder for holding the substrate to be implanted.."], an arm [referred to as "ion absorber" or beamstop] for supporting the wafer holder in the implantation chamber and having a portion adjacent the wafer holder which is at least intermittently exposed to the ion beam during implantation [abstract, col 1 lines 58 to 61], and an arm shield mechanism providing a plurality of shielding surfaces [abstract, figs 1 and 2 and elements 29, 31 and 33 in fig 3, col 5 line 64 to col 6 line 11] which can be selectively disposed to receive the ion beam to protect said exposed portion of the arm [col 4 lines 5 to 11, col 7 lines 21 to 23].

Regarding claim 8, England et al. disclose that each shielding surface is thermally isolated from a juxtaposed shielding surface [col 2 lines 57 to 67].

Regarding claim 9, England et al. disclose an apparatus that includes an ion implanter for implanting ions into a wafer [abstract, claim 1]

Regarding claim 10, England et al. disclose a method for protecting an arm of a wafer support apparatus for an ion implanter [claim 15], the implanter having an implantation chamber for receiving an ion beam [abstract, col 1 lines 52 to 56], the arm or ion absorber support for supporting a wafer holder in the implantation chamber [col 1 lines 51 to 53] and having a portion adjacent the wafer holder which is at least intermittently exposed to the ion beam during wafer implantation [col 1 lines 58 to 61], the method comprising; disposing a first shielding surface of a shield mechanism to receive the said ion beam to protect the said exposed portion of the arm for a pre-determined number of processes, and disposing a second shielding surface to protect the said exposed portion of the arm after a pre-determined number of wafer processes or if the ion species in the ion beam is changed [col 7 lines 21 to 64].

Regarding claim 11, England et al. disclose a method where the shielding surfaces are moved automatically between wafer processes to protect the said exposed portion of the arm [col 7 lines 21 to 56].

Regarding claim 13, England et al. disclose a shield apparatus for protecting an arm of a wafer support mechanism from ions in an ion beam during a wafer ion implantation process, comprising a plurality of shield portions, each being movable between a first and second position with respect to the arm, so that ions in the ion beam are prevented from hitting the arm by a shield portion in the first position, and substantially no ions in the ion beam hit a shield portion in the second position [col 2 lines 41 to 47, col 2 lines

54 to 59, col 4 lines 5 to 11, figs 1 to 3 and claims 1 to 3].

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 2 – 4, 7 and 12 are rejected under 35 U.S.C. 103(a) as being anticipated over England et al. (US 6,093,456) in view of Murrell et al. (Proceedings of the 11th International Conference on Ion Implantation Technology, pages 147 –150, 1997).

Regarding claim 2, England et al. disclose a wafer support apparatus for an ion implanter, a wafer holder, an arm for supporting the wafer holder and having a portion adjacent the wafer holder which is at least intermittently exposed to the ion beam and an arm shield mechanism. England et al. fail to explicitly disclose that the shielding surfaces are disposed on a sleeve arranged over the arm.

However Murrell et al. teaches a beamstop designed with three separate graphite plates or shielding surfaces mounted on a rotatable flange [arm], where each plate is dedicated to one ion species [abstract, page 147 col 1 para 2].

Given the teachings of Murrell et al. it would have been obvious to one of ordinary skill in the art at the time the invention was made, to modify the invention of England et al. with the three graphite plates mounted on a sleeve arranged over a flange or arm.

Doing so would provide an alternate beamstop to the one of England et al. with reduced contamination, thus reducing the need for clean-up implants and increasing tool availability [page 150 col 2 para 3].

Regarding claim 3, England et al. disclose a wafer support apparatus for an ion implanter, a wafer holder, an arm for supporting the wafer holder and having a portion adjacent the wafer holder which is at least intermittently exposed to the ion beam and an arm shield mechanism. England et al. disclose a rotary shaft [element 11 in fig 1] with a rotational axis that is parallel to the ion beam [col 5 lines18 to 23, element 15 in fig 1] which is exactly the case in the present application and is illustrated in figs 1 to 4. England et al. fail to explicitly disclose that the shielding surfaces are disposed on a sleeve arranged over the arm.

However Murrell et al. explicitly teaches a beamstop designed with three separate graphite plates or shielding surfaces mounted on a rotatable flange or arm [abstract, page 147 col 1 para 2].

Given the teachings of Murrell et al. it would have been obvious to one of ordinary skill in the art at the time the invention was made, to modify the beamstop in the invention of England et al. with the three graphite plates directly mounted on a sleeve arranged over a flange or arm. Doing so would provide an alternate beamstop to the one of England et al. with reduced contamination, thus reducing the need for clean-up implants and increasing tool availability [page 150 col 2 para 3].

Regarding claim 4, England et al. disclose a wafer support apparatus for an ion implanter, a wafer holder, an arm for supporting the wafer holder and having a portion

adjacent the wafer holder which is at least intermittently exposed to the ion beam and an arm shield mechanism. England et al. disclose a rotary shaft [element 11 in fig 1] with a rotational axis that is parallel to the ion beam [col 5 lines18 to 23, element 15 in fig 1] which is exactly the case in the present application and is illustrated in figs 1 to 4. England et al. fail to explicitly disclose that the shielding surfaces are disposed on a sleeve arranged over the arm.

However Murrell et al. explicitly teaches a beamstop designed with three separate graphite plates or shielding surfaces mounted on a rotatable flange or arm [abstract, page 147 col 1 para 2]. Although not explicitly mentioned by Murrell et al., three separate graphite plates mounted on an arm would have to be positioned such that the arm or sleeve has three facets and a shielding surface is disposed on each facet.

Given the teachings of Murrell et al. it would have been obvious to one of ordinary skill in the art at the time the invention was made, to modify the beamstop in the invention of England et al. with the three graphite plates directly mounted on a sleeve arranged over a flange or arm. Doing so would provide an alternate beamstop to the one of England et al. with reduced contamination, thus reducing the need for clean-up implants and increasing tool availability [page 150 col 2 para 3].

Regarding claim 7, England et al. disclose the shielding surface is disposed to receive the ion beam and is arranged so that the ion beam strikes [element 17 in figs 1 and 2] the said shielding surface [element 35 in figs 1 and 2] with a substantially perpendicular angle of incidence.

Regarding claim 12, England et al. disclose a method where the shielding surfaces

are disposed over the arm, and the arm is rotated relative to the arm's longitudinal axis to dispose a shielding surface to protect the said exposed portion of the arm. [abstract, col 1 lines 58 to 61, figs 1 to 3, col 4 lines 5 to 11, col 5 line 64 to col 6 line 11, col 7 lines 21 to 23]. England et al. fail to explicitly disclose that the shielding surfaces are disposed on a sleeve arranged over the arm.

However Murrell et al. teaches a beamstop designed with three separate graphite plates or shielding surfaces mounted on a rotatable flange [arm], where each plate is dedicated to one ion species [abstract, page 147 col 1 para 2]. Given the teachings of Murrell et al. it would have been obvious to one of ordinary skill in the art at the time the invention was made, to modify the invention of England et al. with the three graphite plates mounted on a sleeve arranged over a flange or arm. Doing so would provide an alternate beamstop to the one of England et al. with reduced contamination, thus reducing the need for clean-up implants and increasing tool availability [page 150 col 2 para 3].

5. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being anticipated over England et al. (US 6,093,456) in view of Murrell et al. (Proceedings of the 11th International Conference on Ion Implantation Technology, pages 147 –150, 1997), and in further view of Edwards et al. (US 6,392,245).

Regarding claims 5 and 6, England et al's invention as modified by Murrell et al. discloses all of the claimed limitations except for a ridge extending substantially from an end of the shielding surface. Further, England et al's invention as modified by Murrell et al. also discloses all of the claimed limitations except for a ridge or ridges of

a first shielding surface that protrudes by a sufficient amount to receive the ion beam and protects at least one juxtaposed shielding surface.

However Edwards et al. teaches that to minimize the risk of an ion beam contacting the side faces of a spoke arm in a scanning wheel in an ion implantation chamber, the side faces should not extend beyond the rearward projection of the front face and should taper symmetrically inwards on each side relative to the axis of rotation [col 1 lines 50 to 59, col 2 lines 31 to 36, figs 1 and 2]. Material sputtered from the front faces of the spoke arms by the impinging ion beam produces contamination on the surface of the semiconductor wafers being processed and increases unwanted material on the processed wafers. By tapering the side faces of the spoke arm, the risk of ion beam contacting the side faces is greatly minimized.

Given the teachings of Edwards et al., using the same principle, it would be obvious to one of ordinary skill in the art at the time the invention was made to further modify the shielding surface to include a ridge that extends from end of the shielding surface and along the longitudinal axis of the arm when the shielding surface is disposed to receiving the ion beam and to include a ridge or ridges for a first shielding surface that protrudes by a sufficient amount to receive the ion beam and protects at least one juxtaposed shielding surface. Adding a ridge extending from the end of a shielding surface and adding a ridge or ridges such that protrude by a sufficient amount so as to protect the adjacent shielding surface, would ensure no material sputtered from the shielding surface is deposited on the adjacent shielding surface thereby reducing the level of contamination in the processing of wafers and improving the

performance of the devices.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Meenakshi S. Sahu whose telephone number is 571-270-1301. The examiner can normally be reached on Monday - Friday 8AM - 5PM est.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrell L. McKinnon can be reached on 571-272-4797. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Meenakshi S. Sahu
June 13, 2007

TERRELL L. MCKINNON
SUPERVISORY PATENT EXAMINER